



**Air Quality**  
**PERMIT TO CONSTRUCT**  
**State of Idaho**  
**Department of Environmental Quality**

**PERMIT No.:** P-060520

**FACILITY ID No.:** 023-00001

**AQCR:** 61

**CLASS:** A

**SIC:** 9999

**ZONE:** 12

**UTM COORDINATE (km):** 342.5, 4827.2

**1. PERMITTEE**

U.S. Department of Energy, Idaho Operations Office (DOE-ID), and CH2M-WG Idaho, LLC (CWI)

**2. PROJECT**

Integrated Waste Treatment Unit (IWTU) at the INL Idaho Nuclear Technology and Engineering Center (INTEC)

**3. MAILING ADDRESS**

1955 Fremont Avenue

**CITY**

Idaho Falls

**STATE**

ID

**ZIP**

83415-1203

**4. FACILITY CONTACT**

Teresa Perkins

**TITLE**

Director, Environmental Support Division

**TELEPHONE**

(208) 526-1483

**5. RESPONSIBLE OFFICIALS**

Manager, Department of Energy - Idaho Operations Office  
ESH&Q Vice President, CH2M-WG Idaho, LLC

**TELEPHONE**

(Obtain telephone numbers  
through facility contact if

**6. EXACT PLANT LOCATION**

INTEC, INL

**COUNTY**

Butte

**7. GENERAL NATURE OF BUSINESS & KINDS OF PRODUCTS**

Multipurpose National Laboratory

**8. GENERAL CONDITIONS**

This permit is issued according to IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, and pertains only to emissions of air contaminants regulated by the state of Idaho and to the sources specifically allowed to be constructed or modified by this permit.

This permit (a) does not affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to damage to person or property caused by, resulting from, or arising out of the design, installation, maintenance, or operation of the proposed equipment; (c) does not release the permittee from compliance with other applicable federal, state, tribal, or local laws, regulations, or ordinances; (d) in no manner implies or suggests that the Department of Environmental Quality (DEQ) or its officers, agents, or employees, assume any liability, directly or indirectly, for any loss due to damage to person or property caused by, resulting from, or arising out of design, installation, maintenance, or operation of the proposed equipment.

This permit will expire if construction has not begun within two years of its issue date or if construction is suspended for one year.

This permit has been granted on the basis of design information presented with its application. Changes of design or equipment may require DEQ approval pursuant to the Rules for the Control of Air Pollution in Idaho, IDAPA 58.01.01.200, et seq.

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**KEN HANNA, PERMIT WRITER**  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**

\_\_\_\_\_  
**MIKE SIMON, STATIONARY SOURCE PROGRAM MANAGER**  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**

**DATE ISSUED:** \_\_\_\_\_  
Draft

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## Acronyms, Units, and Chemical Nomenclature

AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
CO	carbon monoxide
CWI	CH2M Washington Group Idaho, LLC; CH2M-WG Idaho, LLC
DEQ	Department of Environmental Quality
DOE-ID	U.S. Department of Energy, Idaho Operations Office
EPA	U.S. Environmental Protection Agency
gal/yr	gallons per year
HEPA	high efficiency particulate air
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IWTU	Integrated Waste Treatment Unit
km	kilometer
lb/hr	pound per hour
m	meter(s)
mrem/yr	millirem per year
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGLW	newly generated liquid waste
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
PM	particulate matter
PM <sub>10</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PTC	permit to construct
SBW	sodium bearing waste
SIC	Standard Industrial Classification
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	sulfur oxides
T/yr	tons per year
UTM	Universal Transverse Mercator
VOC	volatile organic compound

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## **1. PERMIT TO CONSTRUCT SCOPE**

### ***Purpose***

- 1.1 This Permit to Construct (PTC) allows for the construction of a new liquid waste treatment unit which utilizes steam reforming technology to be located at the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Laboratory (INL). The new unit is called the Integrated Waste Treatment Unit (IWTU). This PTC is the initial permit for the IWTU.

### ***Regulated Sources***

Table 1.1 lists all sources of regulated emissions in this PTC.

**Table 1.1 SUMMARY OF REGULATED SOURCES**

<b>Permit Section</b>	<b>Source Description</b>	<b>Emissions Control(s)</b>
2	Denitration and Mineralization Reformer (DMR); 3.5 gallons per minute design waste feed rate	Process HEPA Filter System
2	Carbon Reduction Reformer (CRR)	Process HEPA Filter System
2	Treatment Product Transfer and Loadout System	Building Ventilation HEPA Filter System

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## 2. INTEGRATED WASTE TREATMENT UNIT (IWTU)

### 2.1 Process Description

The IWTU is designed to treat liquid sodium bearing waste (SBW) and newly generated liquid waste (NGLW) to produce a solid treatment product for ultimate disposal. The IWTU will utilize steam reforming technology which includes a dual fluidized-bed process that uses superheated steam, carbon, and other additives to convert the SBW into a solid, granular treatment product that is packaged into canisters suitable for ultimate disposal. The system is designed to operate with a liquid feed rate that will not exceed 3.5 gallons per minute. The process is named the IWTU because two fluidized-bed steam reformers, the Denitration and Mineralization Reformer (DMR) and the Carbon Reduction Reformer (CRR), are integrated into a single treatment process with a common air pollution control system. The DMR, CRR and material transfer and loadout systems utilize filters that are integral to the processing system used to capture and package the solid treatment product; these filters are not part of the air pollution control system. The IWTU air pollution control system includes the Process HEPA Filter system (which is located downstream from the DMR and CRR) and the Building Ventilation HEPA Filter system.

### 2.2 Emissions Control Description

**Table 2.1 IWTU DESCRIPTION**

Emissions Unit(s) / Process(es)	Emissions Control Device	Emissions Point
Denitration and Mineralization Reformer (DMR)	Process HEPA Filter System	IWTU stack: 120 ft height; 5 ft exit diameter; 144°F exit temperature, and 59 ft/second estimated exit velocity
Carbon Reduction Reformer (CRR)	Process HEPA Filter System	IWTU stack
Treatment Product Transfer and Loadout System	Building Ventilation HEPA Filter System	IWTU stack

## ***Emissions Limits***

### 2.3 Radionuclide Emissions Limits - NESHAPS

The permittee shall comply with the requirements specified in 40 CFR 61, Subpart H. Emissions of radionuclides to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive, in any year, an effective dose equivalent of 10 millirems per year (mrem/yr).

**[IDAPA 58.01.01.591, 5/1/94; 40 CFR 61.92]**

### 2.4 NO<sub>x</sub> Emissions Limit

The NO<sub>x</sub> emissions from the IWTU stack shall not exceed any corresponding emission rate limit listed in the table below.

**Table 2.2 IWTU NO<sub>x</sub> EMISSIONS LIMIT<sup>a</sup>**

Emission Point	NO <sub>x</sub>
	T/yr
IWTU Stack	32

<sup>a</sup> The permittee shall not exceed the T/yr listed based on any consecutive 12-month period.

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**[IDAPA 58.01.01.211.01, 5/1/94]**

**2.5 Visible Emissions**

No person shall discharge any air pollutant to the atmosphere from any point of emission for a period or periods aggregating more than three minutes in any 60-minute period which is greater than 20% opacity as determined by procedures contained in IDAPA 58.01.01.625. These provisions shall not apply when the presence of uncombined water, nitrogen oxides, and/or chlorine gas are the only reason(s) for the failure of the emissions to comply with the requirements of this section.

**[IDAPA 58.01.01.625, 4/5/00]**

***Operating Requirements***

**2.6 Throughput Limit**

The annual feed rate of liquid waste fed into the IWTU shall not exceed 1,236,000 gallons per consecutive 12 month period (gal/yr).

**[IDAPA 58.01.01.211.01, 5/1/94]**

**2.7 Process HEPA Filter System**

The permittee shall install, operate, and maintain at least one stage of HEPA filters, to filter emissions from the DMR and CRR, having a minimum particle removal efficiency of no less than 99.97%. The permittee shall maintain and operate instrumentation to measure the pressure drop across the filter stages. HEPA filter efficiency shall be tested after installation and on an annual basis according to the ANSI N510 testing standard. All HEPA filters must be pre-tested and certified prior to installation and must meet government performance specifications of DOE-STD-3020-05 and the overpressure and rough handling requirements of ASME AG-1.

**[IDAPA 58.01.01.211.01, 5/1/94 (State-only Requirement)]**

**2.8 Building Ventilation HEPA Filter System**

The permittee shall install, operate, and maintain at least one stage of HEPA filters, to filter emissions from the IWTU building, having a minimum particle removal efficiency of no less than 99.97%. The permittee shall maintain and operate instrumentation to measure the pressure drop across the filter stages. HEPA filter efficiency shall be tested after installation and on an annual basis according to the ANSI N510 testing standard. All HEPA filters must be pre-tested and certified prior to installation and must meet government performance specifications of DOE-STD-3020-05 and the overpressure and rough handling requirements of ASME AG-1.

**[IDAPA 58.01.01.211.01, 5/1/94 (State-only Requirement)]**

***Monitoring and Recordkeeping Requirements***

**2.9 Radionuclide Emission Monitoring and Test Procedures - NESHAP**

In accordance with 40 CFR 61.93, the permittee shall determine radionuclide emissions and calculate effective dose equivalent values to members of the public using EPA-approved methods.

**[40 CFR 61, Subpart H]**

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**2.10 NO<sub>x</sub> Performance Test**

Within 60 days of achieving the maximum production rate of the IWTU, but not later than 180 days after initial startup of the source, the permittee shall conduct a performance test to measure NO<sub>x</sub> emissions from the IWTU stack to demonstrate compliance with the NO<sub>x</sub> emission limit in Permit Condition 2.4. The test may be performed before radioactive material is introduced into the IWTU using surrogate liquid feed (not radioactive) that is representative of the actual mixed waste liquid that will be processed by the IWTU. The test shall be conducted in accordance with the procedures outlined in 40 CFR 60, Appendix A, Method 7, or a DEQ-approved alternative. The test shall be performed in accordance with IDAPA 58.01.01.157 and PTC General Provision 6. In addition, the following actions shall be taken during each performance test run and reported in the performance test report:

- The IWTU shall be operated at the worst case normal production rate during the performance test. A description of how this requirement was met shall be included in the performance test report.
- Visible emissions shall be observed and recorded using the methods specified in IDAPA 58.01.01.625.
- The processing rate of the IWTU shall be recorded in units of gallons per minute of waste fed into the unit.

[IDAPA 58.01.01.211.01, 5/1/94]

**2.11 Throughput Monitoring**

The total gallons of liquid waste fed into the IWTU shall be monitored and recorded on a monthly basis in units of gallons per month and gallons per consecutive 12 month period (gal/yr). All monitoring records shall be retained for a period of at least five years and shall be made available in either hard copy or electronic format to DEQ representatives upon request.

[IDAPA 58.01.01.211.01, 5/1/94]

**2.12 HEPA Filter Monitoring**

When in operation, the permittee shall monitor and record the pressure drop across the HEPA filter stages of the Process HEPA Filter System and the Building Ventilation HEPA System according to written procedures. Written procedures shall be maintained which specify the following: how the pressure drop across the filters will be measured; how frequently the pressure drop will be recorded; and the conditions which require change out of the filters.

[IDAPA 58.01.01.211.01, 5/1/94 (State-only Requirement)]

***Reporting Requirements***

**2.13 Radionuclide Emissions Compliance and Reporting - NESHP**

The permittee shall submit annual reports and maintain records documenting radionuclide emissions and effective dose equivalent values in accordance with 40 CFR 61.94 and 61.95.

[40 CFR 61, Subpart H]

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### 3. PERMIT TO CONSTRUCT GENERAL PROVISIONS

#### ***General Compliance***

1. The permittee has a continuing duty to comply with all terms and conditions of this permit. All emissions authorized herein shall be consistent with the terms and conditions of this permit and the Rules for the Control of Air Pollution in Idaho. The emissions of any pollutant in excess of the limitations specified herein, or noncompliance with any other condition or limitation contained in this permit, shall constitute a violation of this permit and the Rules for the Control of Air Pollution in Idaho, and the Environmental Protection and Health Act, Idaho Code §39-101, et seq.  
[Idaho Code §39-101, et seq.]
2. The permittee shall at all times (except as provided in the Rules for the Control of Air Pollution in Idaho) maintain in good working order and operate as efficiently as practicable, all treatment or control facilities or systems installed or used to achieve compliance with the terms and conditions of this permit and other applicable Idaho laws for the control of air pollution.  
[IDAPA 58.01.01.211, 5/1/94]
3. Nothing in this permit is intended to relieve or exempt the permittee from the responsibility to comply with all applicable local, state, or federal statutes, rules and regulations.  
[IDAPA 58.01.01.212.01, 5/1/94]

#### ***Inspection and Entry***

4. Upon presentation of credentials, the permittee shall allow DEQ or an authorized representative of DEQ to do the following:
  - a. Enter upon the permittee's premises where an emissions source is located or emissions related activity is conducted, or where records are kept under conditions of this permit;
  - b. Have access to and copy, at reasonable times, any records that are kept under the conditions of this permit;
  - c. Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit; and
  - d. As authorized by the Idaho Environmental Protection and Health Act, sample or monitor, at reasonable times, substances or parameters for the purpose of determining or ensuring compliance with this permit or applicable requirements.

[Idaho Code §39-108]

#### ***Construction and Operation Notification***

5. The permittee shall furnish DEQ written notifications as follows in accordance with IDAPA 58.01.01.211:
  - a. A notification of the date of initiation of construction, within five working days after occurrence;
  - b. A notification of the date of any suspension of construction, if such suspension lasts for one year or more;



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- c. A notification of the anticipated date of initial start-up of the stationary source or facility not more than sixty days or less than thirty days prior to such date;
- d. A notification of the actual date of initial start-up of the stationary source or facility within fifteen days after such date; and
- e. A notification of the initial date of achieving the maximum production rate, within five working days after occurrence - production rate and date.

**[IDAPA 58.01.01.211, 5/1/94]**

***Performance Testing***

6. If performance testing (air emissions source test) is required by this permit, the permittee shall provide notice of intent to test to DEQ at least 15 days prior to the scheduled test date or shorter time period as approved by DEQ. DEQ may, at its option, have an observer present at any emissions tests conducted on a source. DEQ requests that such testing not be performed on weekends or state holidays.

All performance testing shall be conducted in accordance with the procedures in IDAPA 58.01.01.157. Without prior DEQ approval, any alternative testing is conducted solely at the permittee's risk. If the permittee fails to obtain prior written approval by DEQ for any testing deviations, DEQ may determine that the testing does not satisfy the testing requirements. Therefore, at least 30 days prior to conducting any performance test, the permittee is encouraged to submit a performance test protocol to DEQ for approval. The written protocol shall include a description of the test method(s) to be used, an explanation of any or unusual circumstances regarding the proposed test, and the proposed test schedule for conducting and reporting the test.

Within 30 days following the date in which a performance test required by this permit is concluded, the permittee shall submit to DEQ a performance test report. The written report shall include a description of the process, identification of the test method(s) used, equipment used, all process operating data collected during the test period, and test results, as well as raw test data and associated documentation, including any approved test protocol.

**[IDAPA 58.01.01.157, 4/5/00]**

***Monitoring and Recordkeeping***

7. The permittee shall maintain sufficient records to ensure compliance with all of the terms and conditions of this permit. Records of monitoring information shall include, but not be limited to the following: (a) the date, place, and times of sampling or measurements; (b) the date analyses were performed; (c) the company or entity that performed the analyses; (d) the analytical techniques or methods used; (e) the results of such analyses; and (f) the operating conditions existing at the time of sampling or measurement. All monitoring records and support information shall be retained for a period of at least five years from the date of the monitoring sample, measurement, report, or application. Supporting information includes, but is not limited to, all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation and copies of all reports required by this permit. All records required to be maintained by this permit shall be made available in either hard copy or electronic format to DEQ representatives upon request.

**[IDAPA 58.01.01.211, 5/1/94]**

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### ***Excess Emissions***

8. The permittee shall comply with the procedures and requirements of IDAPA 58.01.01.130-136 for excess emissions due to startup, shutdown, scheduled maintenance, safety measures, upsets and breakdowns.

[IDAPA 58.01.01.130-136, 4/5/00]

### ***Certification***

9. All documents submitted to DEQ, including, but not limited to, records, monitoring data, supporting information, requests for confidential treatment, testing reports, or compliance certification shall contain a certification by a responsible official. The certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

[IDAPA 58.01.01.123, 5/1/94]

### ***False Statements***

10. No person shall knowingly make any false statement, representation, or certification in any form, notice, or report required under this permit, or any applicable rule or order in force pursuant thereto.

[IDAPA 58.01.01.125, 3/23/98]

### ***Tampering***

11. No person shall knowingly render inaccurate any monitoring device or method required under this permit or any applicable rule or order in force pursuant thereto.

[IDAPA 58.01.01.126, 3/23/98]

### ***Transferability***

12. This permit is transferable in accordance with procedures listed in IDAPA 58.01.01.209.06.

[IDAPA 58.01.01.209.06, 4/11/06]

### ***Severability***

13. The provisions of this permit are severable, and if any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.